Occultation of Ceres by the Moon on 1897 *November* 13. *Observed at the Hamburg Observatory.* By Prof. George Rümker, M.A., Director of the Observatory.

(*Communicated by the Secretaries.*)

In consequence of the communication in *Monthly Notices*, vol. lvii. No. 9, it has been possible for Dr. R. Schorr to observe the occultation with the $9\frac{1}{2}$-inch equatorial of this observatory. The planet was clearly visible before the immersion near the Moon's limb, but, unfortunately, a few seconds before occultation thin clouds covered the Moon, and the planet disappeared. The time of immersion could therefore only be estimated as $10^h\ 45^m\ 15^s$ Greenwich Mean Time, with an uncertainty of ± 5 seconds. The reappearance of the planet was well observed in a cloudless sky at $11^h\ 43^m\ 4^s{\cdot}4$ Greenwich Mean Time.

The reappearance was not instantaneous, but the light showed a distinct increase for $0^s{\cdot}1$ or $0^s{\cdot}2$. With a comet-seeker of 5 inches clear aperture the phenomena could not be observed.

Occultation of Ceres by the Moon, 1897 *November* 13, *observed at the Radcliffe Observatory, Oxford.*

(*Communicated by the Radcliffe Observer.*)

The occultation-reappearance of *Ceres* (on the Moon's dark limb) was observed here by Mr. Wickham and myself as follows :

	Observer.	Instrument.	Power.	Time Noted.	Oxford Sidereal Time.	Greenwich Mean Time.
				h m s	h m s	h m s
1897 Nov. 13	A. R.	Barclay Equat.	45	2 58 25·5	2 58 11·98	11 29 54·6
	W.	Heliometer	80	2 59 0·2	2 58 12·03	11 29 54·7

Observers' Remarks : Instantaneous (A. R.). Very good (W.).

Radcliffe Observatory : 1897 *December* 9.

Observations of Meteors on 1897 *November* 13–15, *made at the Radcliffe Observatory, Oxford.*

(*Communicated by the Radcliffe Observer.*)

On November 13 the watch for meteors was continuous from $11^h\ 15^m$ till $17^h\ 45^m$ G.M.T., when clouds quickly and permanently covered the sky.

The night on the whole was very fine, with a heavy dew. The atmosphere was very clear throughout, and the sky cloudless, except for a few short intervals.

The observers' position on the east wing of the Observatory tower commanded an uninterrupted view of the eastern half of the sky. The Moon was, however, very bright, but fortunately the observers were able to work in the shadow of the tower during the greater part of the watch.

Mr. Wickham reports :—A star chart of the region had been previously plotted, and each observer had provided himself with duplicate copies. Mr. Robinson began a watch of the eastern sky at $11^h\ 15^m$, but had only noted one sporadic meteor before he was joined about midnight by Dr. Rambaut and myself, who had been detained by the observation of the occultation of Ceres by the Moon. The number of meteors seen amounted to about forty ; some were quite out of the track of the *Leonids*, and a few were too faint and rapid to leave a definite impression of their paths upon the mind. The presence of the Moon proved a serious obstacle to seeing the fainter meteors, stars less than $4\frac{1}{2}$ mag. being invisible, whilst, in the actual neighbourhood of the Moon, bright stars were recognised only with difficulty. The cluster *Præsepe* could be occasionally seen by glimpses when on the meridian.

Generally, the *Leonids* charted were fainter than the 3rd mag., with a rapidly evanescent track and a duration of about two-tenths of a second only. When bright enough for comparison with star magnitudes, notes of the estimation were made.

The rather numerous sporadic meteors were generally much brighter than the *Leonids*, and had longer and more lasting trails.

General notes by Mr. Robinson :—Stars down to mag. 4 were seen without difficulty, and others slightly fainter could be traced at times. *Præsepe* was visible at intervals, but only as a very feeble haze. The method of observation I adopted was as follows :—Immediately on the appearance of a meteor, a 13-inch pencil, held firmly at arm's length, was placed along the meteor's path, the direction, length of track, and then the approximate time estimated, and the track pencilled on a prepared chart. The chart used contained stars, down to the 4th magnitude inclusive, in *Leo* and surrounding region. A few of the meteors were not sufficiently well observed for an accurate delineation of their paths, but those recorded in the chart are considered fairly accurate in direction, although the swiftness of the phenomena rendered observations very difficult.

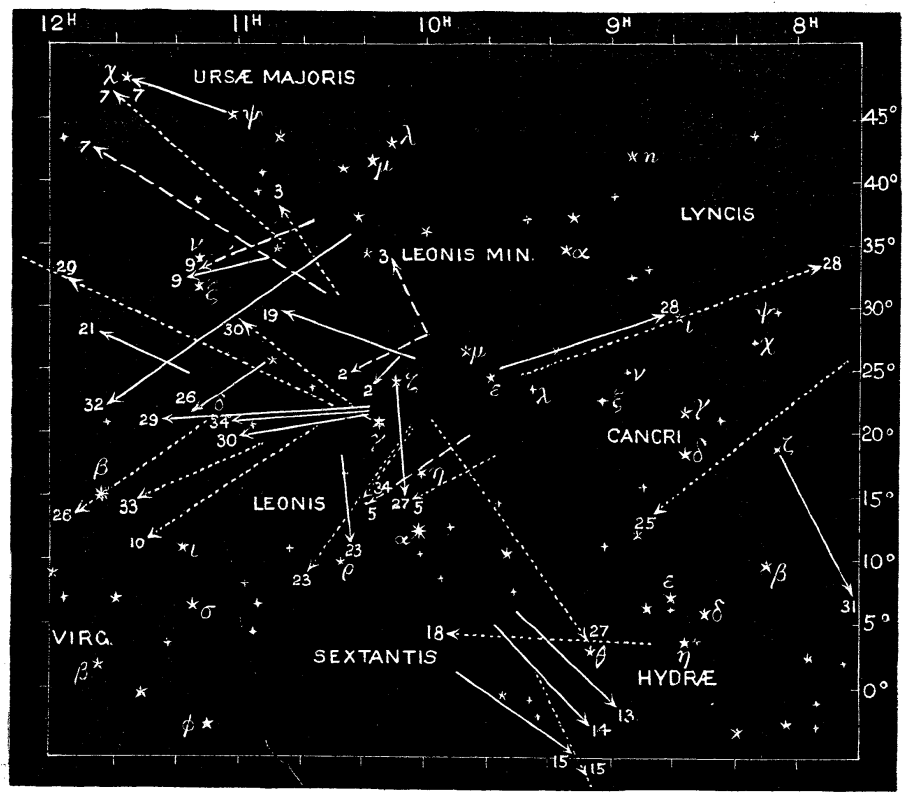
The meteors were generally between the 2nd and 3rd magnitude, the brightest, which excelled the 1st magnitude, occurring at $16^h\ 32^m$ G.M.T. Some as faint as mag. 4 were recorded, but any beyond this limit would, in most cases, be obliterated by the moonlight. Several meteors were obviously from radiants other than *Leo*, but their positions were as a rule only approximately secured.

Radcliffe Observatory, Oxford. Observation of Meteors, 1897 *November* 13.

Ref. No.	Approx. G.M.T. h m	Observers.	Observers' Notes.
1	11 42	R.	Through Castor and Pollux towards equator.
2	12 27	A. R: W.	(W.) A short flash, duration $0^{s}\cdot3$.
3	12 44	A. R: W: R.	(A. R.) Time not observed; faint trail. (W.) Not charted; faint streak; 1 sec. (R.) Beads; good observation.
4	12 57	W.	Not charted; in Ursa Maj.
5	13 5	A. R: R.	(A. R.) Swift.
6	13 16	A. R.	Sporadic; through Ursa Maj.
	13 24		(Clouds passing in south.)
7	13 27	A. R: W: R.	(A. R.) Very swift; faint. (R.) Charted on the morning of the 15th from sketch and notes made at the time of observation.
8	13 32	R.	Sporadic in Ursa Maj.
	13 34		(Clouds over Leo.)
9	13 47	A. R: W: R.	(A. R.) Faint. (R.) Sporadic.
10	14 5	R.	Swift.
11	14 7	A. R: W: R.	Sporadic in Ursa Maj. (R.) Very bright.
12	14 21	W.	Sporadic in Ursa Maj.
13	14 22	W.	
14	14 23	W.	Brighter than α Hydræ.
15	14 26	W: R.	(W.) 2nd mag. (R.) 1st mag. Track approximate only.
16	14 37	R.	Across Leo; 4th mag.; swift.
17	14 42	R.	(R.) 4th mag. From Sickle to north of β Leonis.
18	14 59	R.	Sporadic.
19	15 1	W.	
20	15 4	R.	From Sickle to Castor; 4th mag.
21	15 29	W: R.	(R.) Only partially seen.
	15 40 to 15 45		(Cloudy; watched in breaks.)
22	15 47	R.	Sporadic; Capella to Sickle; 2nd mag.
23	15 52	W: R.	(W.) Brighter than 2nd mag. (R.) 2nd mag. good.
24	15 57	W: R.	Sporadic from south of Leo. (R.) 2nd mag.
25	15 59	R.	Sporadic; 3rd mag.
26	16 14	W: R.	(W.) Very swift and faint. (R.) Only approximate; very swift; $2\frac{1}{2}$ mag.
27	16 32	W: R.	(W.) Similar light to magnesium; brighter than 1st mag. (R.) Brighter than 1st mag.
28	16 47	W: R.	(W.) Streak. (R.) Train; several secs. duration.

Ref. No.	Approx. G.M.T. h m	Observers.	Observers' Notes.
29	17 3	W: R.	(R.) Charted on the morning of the 15th from sketch and notes made at the time of observation.
30	17 3½	W: R.	(R.) Shorter track and slightly greater altitude than last.
31	17 11	W.	ζ Cancri to below Procyon.
32	17 17	W: R.	(W.) Very swift. (R.) Seen, but not charted; very swift; from about 10h 30m R.A. Decl. +30° towards Arcturus.
33	17 32	R.	Approximate; very swift; 3rd mag.
34	17 39	W: R.	(R.) 2nd mag.
35	17 39	W.	Sporadic.
	17 45		(Very cloudy.)

Observers: A. R., A. A. Rambaut. W., W. Wickham. R., W. H. Robinson.



Meteor Tracks, 1897 Nov. 13.
Observers: A. A. Rambaut ---------- W. Wickham ———
W. H. Robinson .....

The night of November 14 was overcast, with frequent rain, but on the 15th, although the sky was generally cloudy, Mr. Robinson reports that frequent breaks occurred in the neighbourhood of *Leo* between 12h 45m and 15h 30m, during which interval

only one meteor was seen at $13^h\ 9^m$ G.M.T., its track proceeding from $5^h\ 50^m$ R.A. $+40°$ Decl. to $3^h\ 40^m$ R.A. $+25°$ Decl. During the three hours' watch opportunities enough were afforded to have noted anything like a rich shower had it occurred.

On the effect of Chromatic Dispersion of the Atmosphere on the Parallaxes of α Centauri and β Orionis, and on a method of determining its effect on the Value of the Solar Parallax derived from Heliometer Observations of Minor Planets. By David Gill, C.B., LL.D., F.R.S., Her Majesty's Astronomer at the Cape of Good Hope.

In connection with the discussion of my Heliometer Observations of *Mars* in 1877 (*Mem. R.A.S.* vol. xlvi. pp. 121 and 161), I have called attention to the effect which a difference between the mean refrangibility of the light of *Mars* and that of the comparison stars might have upon the resulting value of the solar parallax.

In the determination of diurnal parallax it is unfortunately impossible to distinguish with sufficient accuracy between the refraction effect in question and a small residual error in the parallax, because, within such range of zenith distance as accurate observations can be made, the law of increase of refraction does not sufficiently differ from that of parallax.

In observations for stellar parallax it may, with proper precautions, be possible to determine the effect of different refrangibility in the mean light of two stars, because measures of distance can be made at widely different hour angles E and W of the meridian, in which such difference of refraction has opposite effects on the measured distance, whilst the parallax factor remains the same.

Professor Rambaut (*Monthly Notices R.A.S.* 1895 January, vol. lv. p. 123) discusses several series of observations of distance measures of the same pairs of stars made at widely different hour angles, and in some instances obtains a certain amount of evidence that the difference of the mean refrangibility of the light of the two stars is sufficiently great to produce in filar micrometer measures a very sensible error in the derived mean distance, if no corresponding correction is employed in computing the differential refraction.

The only difficulty in computing such corrections is to ascertain what precise wave-length (in the very short spectrum produced by atmospheric dispersion) is bisected by the observer in his observations of any particular star. Indeed, in the case of heliometer observations of the distance between two stars it is not improbable that in estimating the coincidence of the two very short spectra produced by chromatic dispersion of the atmosphere